

NEW SPECIES AND DISTRIBUTION OF THE GENUS *MARILIA* MÜLLER
(TRICHOPTERA: ODONTOCERIDAE) IN MEXICO AND
CENTRAL AMERICA

JOAQUIN BUENO-SORIA AND ALICIA ROJAS-ASCENCIO

Departamento de Zoología, Universidad Nacional Autónoma de México, UNAM Apdo. Postal 70-153, México 04510, D.F., México (e-mail: bueno@servidor.unam.mx)

Abstract.—Nine new species of the genus *Marilia* Müller (Odonoceridae) are described from Mexico, Belize, Guatemala, and Costa Rica: *M. baumanni*, *M. flinti*, *M. furthi*, *M. holzenthali*, *M. kingsolveri*, *M. mathisi*, *M. morsei*, *M. spangleri*, and *M. williammerrilli*. The male genitalia are illustrated. The distribution of *M. flexuosa* Ulmer, *M. nobscæ* Milne, and *M. mexicana* (Banks) is provided. A key to the males of the species of *Marilia* (with the exception of *M. mexicana* Banks) from Mexico and Central America is included.

Key Words: caddisflies, Neotropical, Mexico, Belize, Guatemala, Costa Rica

The genus *Marilia* Müller is widely distributed in the world, with 42 recognized extant and two fossil species. In the New World, the genus is distributed from Canada to Argentina including the Greater Antilles. However, it has not been collected in the Chilean subregion nor in the Lesser Antilles (Flint 1991).

At present, there are only three species known for North America including Mexico: *Marilia flexuosa* Ulmer, *M. nobscæ* Milne, and *M. mexicana* (Banks). Of these, *M. flexuosa* has the widest distribution having been recorded from Canada to Brazil (Flint 1991). Most of the North American species are recorded from southwestern United States through Mexico and Central America.

The immature stages of *M. flexuosa*, *M. ammicola*, and *M. scudderi* were described by Wiggins (1996), Flint (1968), and Botosaneanu (1994), respectively.

In this paper, we describe nine new species of *Marilia* found after studying 602 specimens deposited in the collections at

the University of Minnesota, St. Paul (UMSP), National Museum of Natural History, Smithsonian Institution, Washington, D.C. (NMNH), University of California at Berkeley (UCB), California Academy of Sciences, San Francisco (CAS), and Colección Nacional de Insectos, UNAM (CNIN). Acronyms are used below to indicate type depositaries.

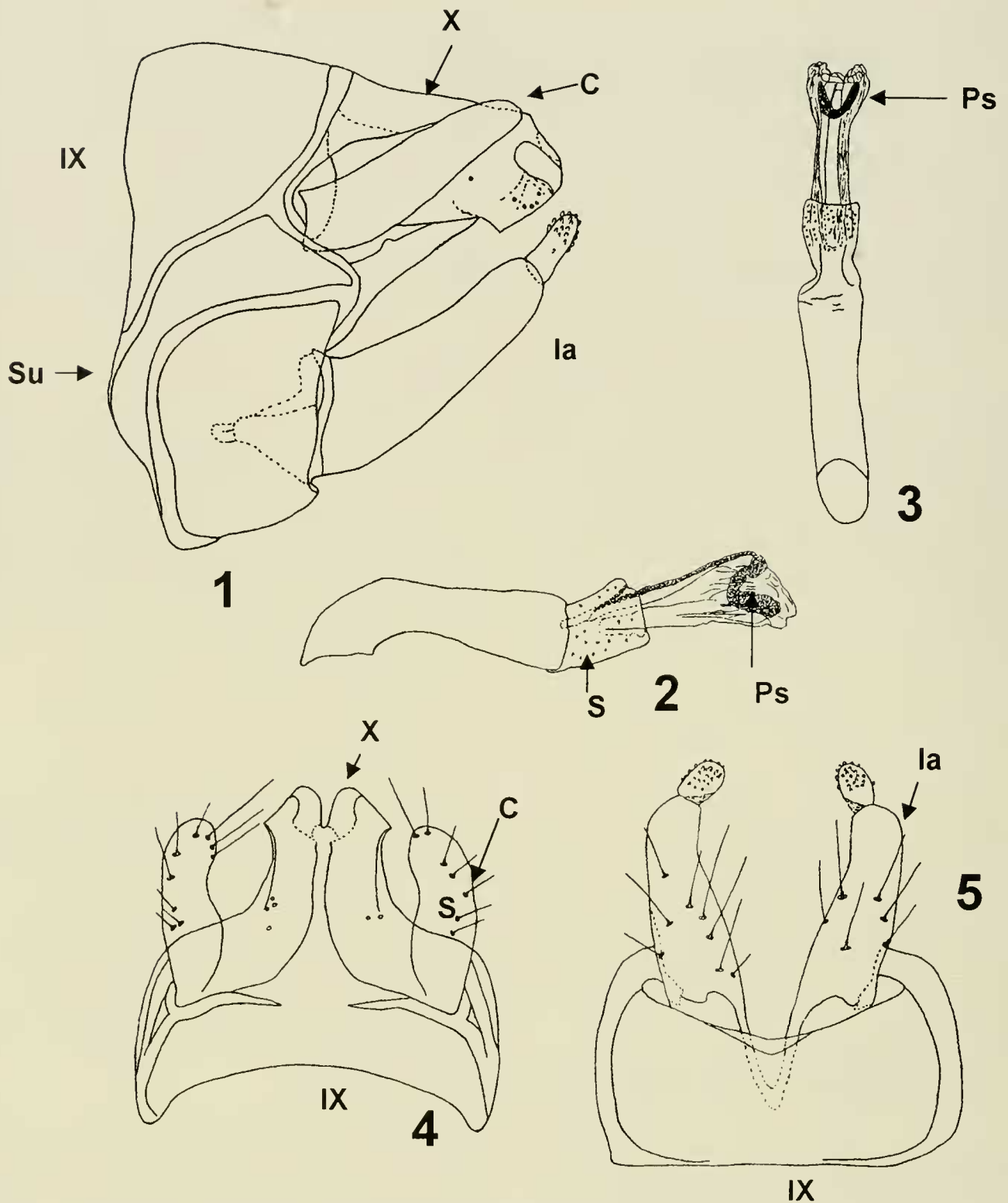
To identify the species here described, we studied the male genitalic structures and some additional morphological characters such as the size of the eyes and the sutures of the IX segment as used by Flint (1983, 1991). All the species here described are treated in alphabetical order.

Marilia baumanni

Bueno and Rojas, new species

(Figs. 1–5)

This species may be related to *Marilia morsei* by the rectangular shape of the lateral sutures of segment IX and by the similar shape of apical portion in lateral and dorsal views of segment X. However, *M.*



Figs. 1-5. *Marilia baumanni*, male genitalia. 1, Lateral view. 2, Phallus lateral. 3, Phallus ventral. 4, Dorsal view. 5, Ventral view. IX = segment 9; Su = suture; X = segment 10; C = cercus; Ia = inferior appendage; S = spine; Ps = phallotremal sclerite.

baumanni can be separated from this species, by the large eyes almost touching mid-dorsally, the shorter and wider segment X in dorsal view, and the two long, parallel, separated sutures on segment IX.

Male.—Eyes large, almost touching mid-dorsally. Length of forewing 8-10 mm. Light brown. Spurs 2,4,4. Genitalia: Seg-

ment IX in lateral aspect with anterior margin nearly straight; posterior margin lightly produced; with two curved sutures prolonged in two, parallel side arms over lateral region, and one dorsal arm along the posterior margin of segment IX. Cercus in lateral and dorsal views thumblike. Segment X in lateral aspect rectangular, apex

with a short, triangular process ventrally directed, with posterodorsal margin lightly rounded; in dorsal aspect short, stout, wide and membranous; apical region with a shallow notch mesally, dividing lateral lobes with sagittate apices. Inferior appendage in lateral aspect with basal segment cylindrical, with a distinct triangular, basal insertion; in posterior aspect preapically curved; apical segment small, ovoid with dark, conical spines. Phallus in lateral view tubular slightly curved at base, endothelial membrane with small spines; phallotremal sclerite rodlike, in ventral aspect V-shaped.

Type material.—Holotype, ♂. MEXICO: Oaxaca: Chiltepec, 24-v-1990, E. Barrera, A. Cadena (CNIN). Paratypes: MEXICO: Oaxaca: Rio Valle Nacional, Chiltepec, 25-v-1981, C. M. & O. S. Flint, 2 ♂ (NMNH); Rio Valle Nacional, Peña Rubia, Rta. 175, 100 m, 9-vii-1996, R. Barba and A. Rojas, 181 ♂ (CNIN); 10 ♂ (NMNH). Tabasco: Rio Samaria, 4 km N rt. 180, ca Complejo Samaria II; 18°00.75'N, 93°05.27'W, 18-ix-1996, 80 m, J. Bueno, R. Barba and A. Contreras, 1 ♂ (CNIN). Chiapas: Ocosingo, Reserva Montes Azules, 11-13-vii-1987, R. Barba, 3 ♂ (CNIN); Ejido Sta. Elena, 50 km N. Lagunas de Montebello, 7-iv-1979, J. Bueno, 2 ♂ (CNIN).

Etymology.—It is a pleasure to name this species after Dr. Richard Baumann specialist in Plecoptera at Brigham Young University.

Marilia crea Mosely 1949: 40, 41
(Figs. 6–10)

The rectangular shape of the lateral sutures on segment IX distinguish this species from all other species of this genus.

Distribution.—COSTA RICA.

Material examined.—COSTA RICA: Puntarenas, S. Finca Helechales, Rio Singri 9.057°N 83.082°W el. 720 m, 21-ii-1986, Holzenthal, Morse, Fasth, 5 ♂ (UMSP); Alajuela, Rio Pizote, ca. 5 km N Dos Rios, el. 470 m, 10.948°N, 85.291°W, 9-iii-1986, Holzenthal & Fasth, 1 ♂ (UMSP); Heredia, Est. Biol. La Selva, Rio Puerto Viejo,

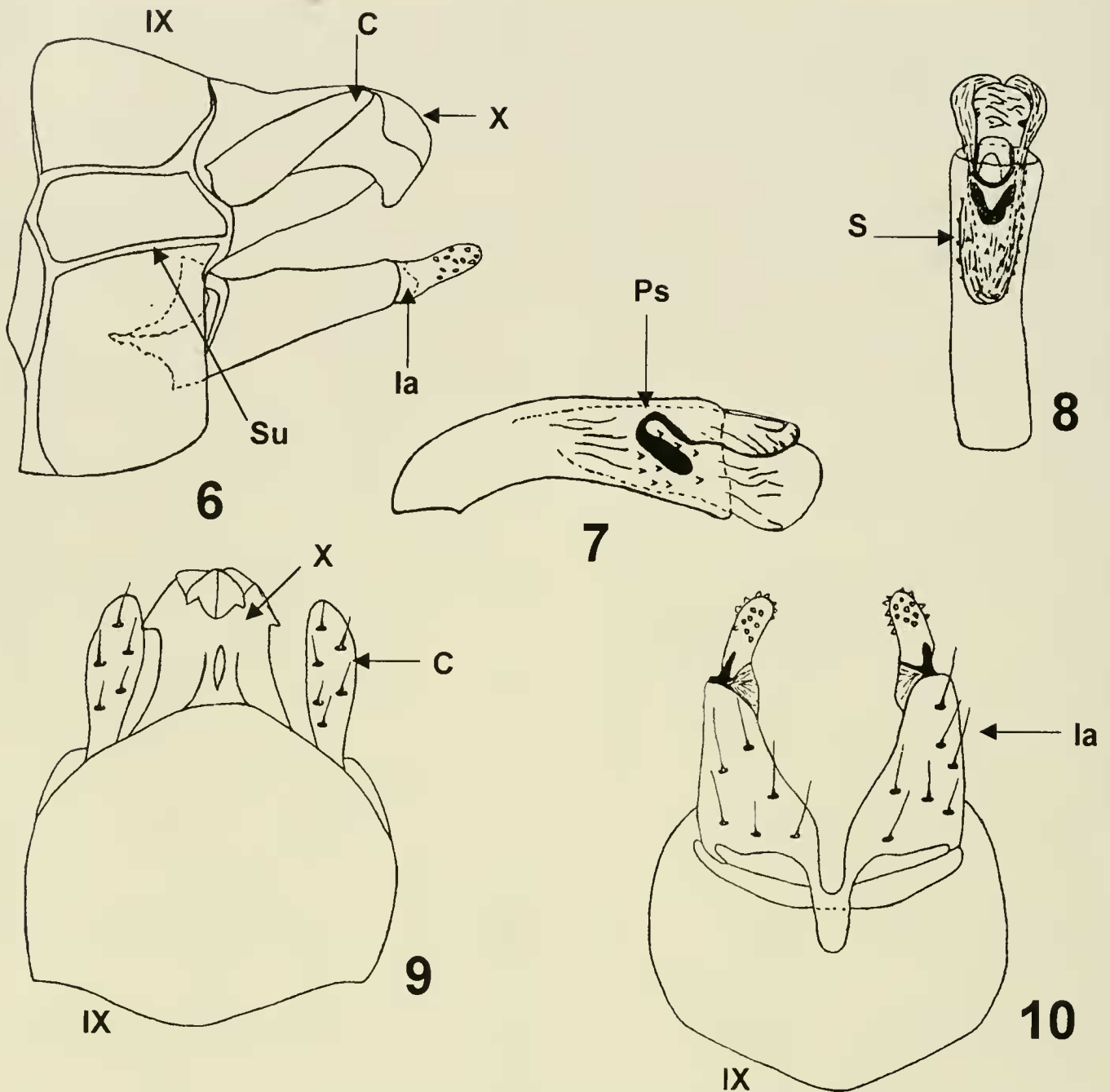
10.440°N, 84.012°W, 10,11-ii-1986, Holzenthal, 1 ♂ (UMSP).

Marilia flexuosa Ulmer 1905: 70
(Figs. 11–17)

This species can be recognized by the small size of the adults (6 mm), tibial formula 2,4,2, and the stigma in the subcostal area of forewing.

Distribution.—CANADA, UNITED STATES: AZ, CA, TX; MEXICO: Baja California Norte, Baja California Sur, Sonora, Chihuahua, Durango, Tamaulipas, Veracruz; GUATEMALA; COSTA RICA; PANAMA; PERU; COLOMBIA; BRAZIL.

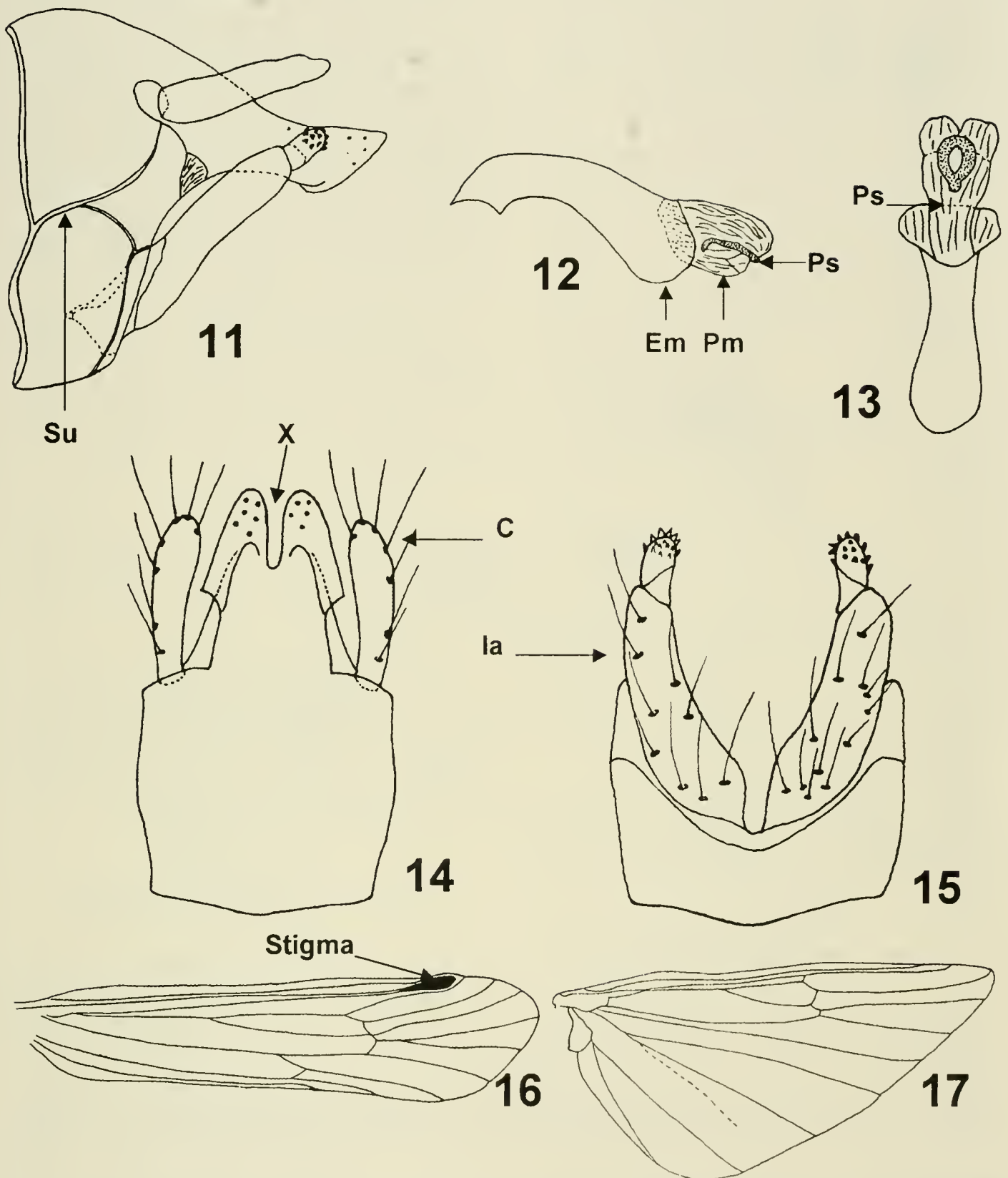
Material examined.—USA: Arizona: Cochise Co., S W, Research Station, near Portal, 12-viii-1961, J. Rozen 2 ♂ 1 ♀ (CAS); Cochise Co., 5 mi W, Portal SW, Research Station 13,14-viii-65, V. Roth 3 ♀ (CAS); Cochise Co., 5 mi W, Portal SW, Research Station, 7–8-viii-65, V. Roth 11 ♂ 10 ♀ (CAS); SW Research Station nr. Portal, 27-June-1965, v. Roth, 149 ♂ 59 ♀ (CAS); near Portal, SW, Research Station, 2.viii.1965, Vince Roth 54 ♂, 71 ♀ (CAS); Cochise Co., 5 mi W, Portal SW, Research Station 5, 6-viii-65, V. Roth 3 ♂ 2 ♀ (CAS); Chiricahua Mts., 6–9800 ft., vii.1927, 1 ♂ (CAS); SW Research Station, Portal, 7-vii-1965, V. Roth 54 ♂ 53 ♀ (CAS); Maricopa Co., Cave Creek Campground, 10-ix-1980, 1 ♂ 1 ♀ (CAS); Cochise Co. Chiricahua Mts., Upper Cave Creek, 6000 ft., 13-vii-1971, V. Roth 1 ♂ (CAS); Cochise Co., SW RS, 5 mi. W Portal, 5400 ft. 1-vii-1976, S. Buchmann 9 ♂ (CAS); SWRS Cochise Co. 5 mi W Portal, 5400 ft. 1.viii.1976, Buchmann 32 ♂ 16 ♀ (CAS); Yanks' Spring, Sycamore Can., Santa Cruz Co., Tumacacori Mts., 3-viii-1952, H. B. Leech & J. W. Green, 5 ♂ 1 ♀ (CAS); Coronada, Ntl. Forest Stewart Forest Camp 13.vii.1969, K. M. Fender, 2 ♂ (CAS); California: Wheelers Spring, Ventura Co., 16.vi.1948, W.W. Wirth, 1 ♂ (CAS); El Dorado Co., 8 mi. SE. El Dorado, on Cosumnes River, 21-vi-1969, J. Haddock, 1 ♂ (CAS); Lake Co., Putah



Figs. 6–10. *Marilia crea*, male genitalia. 6, Lateral view. 7, Phallus, lateral view. 8, Phallus ventral view. 9, Dorsal view. 10, Ventral view.

Creek at SR 29 Bridge, 3-vii-1976, G. Ulrich, 1 ♂ (UCB). MEXICO: *Baja California*: Las Parras, x-1925, W. M. Mann, 1 ♂ (CNIN). *Baja California Norte*: Sierra San Pedro Martir, Rio San Rafael, 20-vii-1987, Baumann & Sargent, 4 ♂ (NMNH). *Baja California Sur*: Arroyo San Pedro, San Pedro de la Soledad, 27-vi-1988, Kondratieff, Baumann, Wells, Whiting and Kirchner, 4 ♂ (NMNH). *Chihuahua*: Rio Gavilan, Las Amarillas, 23-vi-1987, B. Kondratieff & R. W. Baumann, 5 ♂ (NMNH); Arroyo Toro Basin, 1720 m, 23-vi-1987, Kondratieff & R. W. Baumann, 1 ♂ (NMNH). *Nuevo*

Leon: Municipio de Zaragoza, El Salto, 9-xi-1985, R. Barba, 2 ♂ (CNIN). *Tamaulipas*: Rio Purificacion, 40 km Cd. Victoria, 17-xi-1977, J. Bueno, 4 ♂ (CNIN); Río Corona, 18 mi. N Ciudad Victoria, 13-iii-1982, J. E. Gillaspay, 6 ♂ (NMNH). *Jalisco*: Sierra de Manantlan, Arroyo Las Joyas, 6,7-vi-1990, J. Villa, 7 ♂ (CNIN). *Michoacan*: P.N. Morelos, near to Morelia, 14-viii-1966, Flint & Ortiz, 4 ♂ (NMNH). *Veracruz*: Tebanca, 15 km S. E. Estacion de Biologia "Los Tuxtles", 3-iii-1988, R. Barba & E. Barrera, 5 ♂ (CNIN); Rio Jamapa, 6 km N Coscomatepec, 2-v-1981, C. M. & O. S.



Figs. 11–17. *Marilia flexuosa*, male genitalia. 11, Lateral view. 12, Phallus lateral view. 13, Phallus ventral view. 14, Dorsal view. 15, Ventral view. 16, Forewing. 17, Hindwing. Em = Endothelial membrane; Pm = phallosomal membrane.

Flint, Jr., 1 ♂ (NMNH); Ocotal, Tequisapa, 8-xii-1985, R. Barba, 1 ♂ (CNIN). *Guerro*: Rio Placeres del Oro, 22-xi-1984, F. Arias & H. Velasco, 8 ♂ (CNIN). *Puebla*: Teotitlan, Rio Xiquila, 5-xi-1985, R. Barba, 2 ♂ (CNIN). *Oaxaca*: Guelatao, 9-iii-1978,

G. Zapien, 1 ♂ (CNIN); Guelatao, km 158.1 Carretera Federal 175, 1600 m, 11-vii-1996, R. Barba & A. Rojas, 1 ♂ (CNIN); Mixtepec, San Gabriel, 19-vi-1984, H. Velasco, 2 ♂ (CNIN). *Chiapas*: Ocosingo, Montes Azules, 2-v-1986, R.

Barba, 1 ♂ (CNIN); 29-iv-1986, F. Arias, 1 ♂ (CNIN); Chajul, 28-v-1986, F. Arias, 1 ♂ (CNIN); Rio Lacanja, 22 km N Ocosingo, 19-v-1981, C. M. & O. S. Flint Jr., 1 ♂ (NMNH); rt. 35, 4 km N Arriaga, 9-xii-1975, C. M. & O.S. Flint, Jr., 1 ♂ (NMNH). GUATEMALA: Coban: Biotopo km 156, 27-viii-1985, H. Velasco, 4 ♂ (CNIN). COSTA RICA: Puntarenas: Reserva Biologica Carara, Quebrada Bonita, 9.775°N 84.605°W, 35 m, 18,20-v-1990, Holzenthal & Blahnik, 1 ♂ (UMSP); Guanacaste, Parque Nacional Guanacaste, El Hacha, Queb. Alcornoque, 11.009°N 85.577°W, 250 m, 26-viii-1987, Holzenthal, Morse and Clausen, 2 ♂ (UMSP); Parque Nacional Guanacaste, Estacion Pitilla, Rio Orosi, 10.991°N 85.428°W 700 m, 22,25-v-1990, Holzenthal & Blahnik, 1 ♂ (UMSP); Alajuela, Río Pizote, ca 5 Km N. Dos Rios, 10.948°N 85.291°W 470 m, 9-iii-1986, Holzenthal & Fasth, 14 ♂ (UMSP); Alajuela, Rio Pizote, ca. 5 km (air) S Brasilia, 10.972°N, 85.345°W, 390 m, 12-iii-1986, Holzenthal & Fasth, 12 ♂ (UMSP).

New records.—MEXICO: Nuevo Leon, Jalisco, Michoacan, Guerrero, Puebla, Oaxaca, Chiapas, GUATEMALA, COSTA RICA.

Marilia flinti

Bueno and Rojas, new species

(Figs. 18–23)

Marilia flinti belongs to the group of species with tibial formula 2,4,4 and with large spines in the endothecal membrane of the phallus, as in *M. nobscæ*. However, *M. flinti* can be recognized from the other species of this group by the elongated lateral suture in segment IX and by the elongate lateral arms of segment X.

Male.—Eyes small, well separated middorsally. Length of forewing 10 mm. Yellowish brown. Spurs 2,4,4. Genitalia: Segment IX in lateral view with anterior margin lightly produced in a triangular projection; posterior margin produced at mid-length, with lateral sutures almost parallel, dorsal brace slightly curved, ventral one al-

most straight. Cercus in lateral and dorsal view thumblike. Segment X in lateral aspect produced in a narrow process with apex truncate and ventrally directed; in dorsal aspect membranous with square mesal excision, with long lateral arms. Inferior appendage in lateral aspect with basal segment cylindrical with a distinct triangular, basal insertion, in posterior aspect curved; apical segment small, ovoid with dark, conical spines. Phallus in lateral view tubular slightly curved, endothecal membrane with large, dark, dentiform spines, phallotremal sclerite with a curled, dorsomesal process and a ventral curved sclerite in ventral aspect V-shaped.

Type material.—Holotype, ♂. MEXICO: San Luis Potosi: 25 mi. N Tamazunchale, 400', 3,4-viii-1963, Duckworth & Davis (NMNH). Paratype: Same data as holotype, 1 ♂ (NMNH).

Etymology.—This species is named with gratitude and affection for Dr. Oliver S. Flint Jr., emeritus researcher at the National Museum of Natural History, Smithsonian Institution, who has contributed extensively to the knowledge of this group.

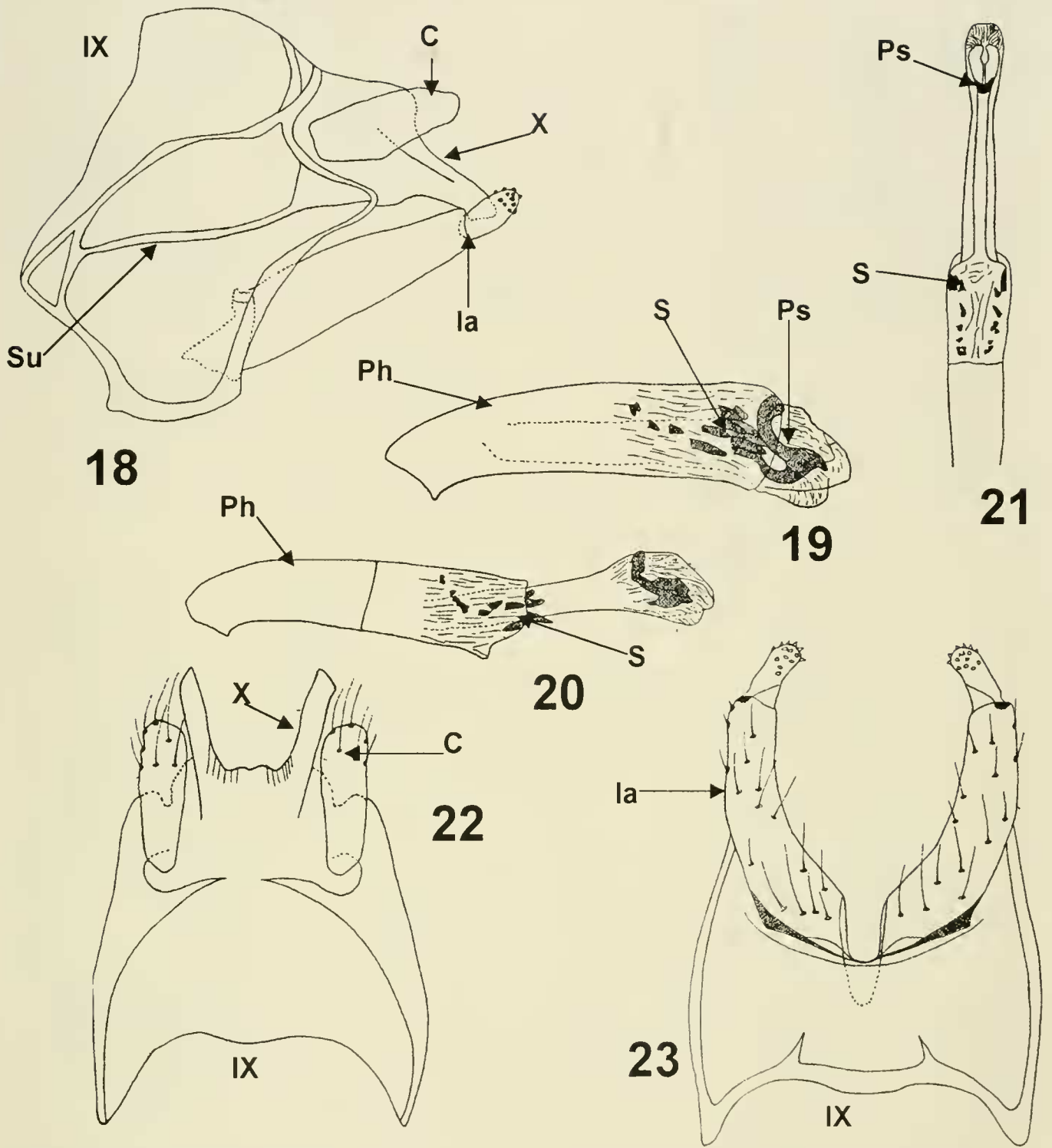
Marilia furthi

Bueno and Rojas, new species

(Figs. 24–27)

This species may be related to *Marilia baumannii* because of the rectangular shape of the lateral sutures on segment IX and its nearly straight anterior margin and the similar shape of the apical portion of segment X in lateral and dorsal views. However, *M. furthi* can be distinguished from this species by the middorsally well-separated small eyes, by the two long parallel, anteriorly touching sutures on segment IX, and by the elongate, narrow, segment X in dorsal view.

Male.—Eyes small and well separated middorsally. Length of forewing 10 mm. Light brown. Spurs 2,4,4. Genitalia: Segment IX in lateral aspect with anterior margin almost straight, posterior margin slightly produced, sutures consisting of two, parallel arms touching anteriorly. Cercus in lat-

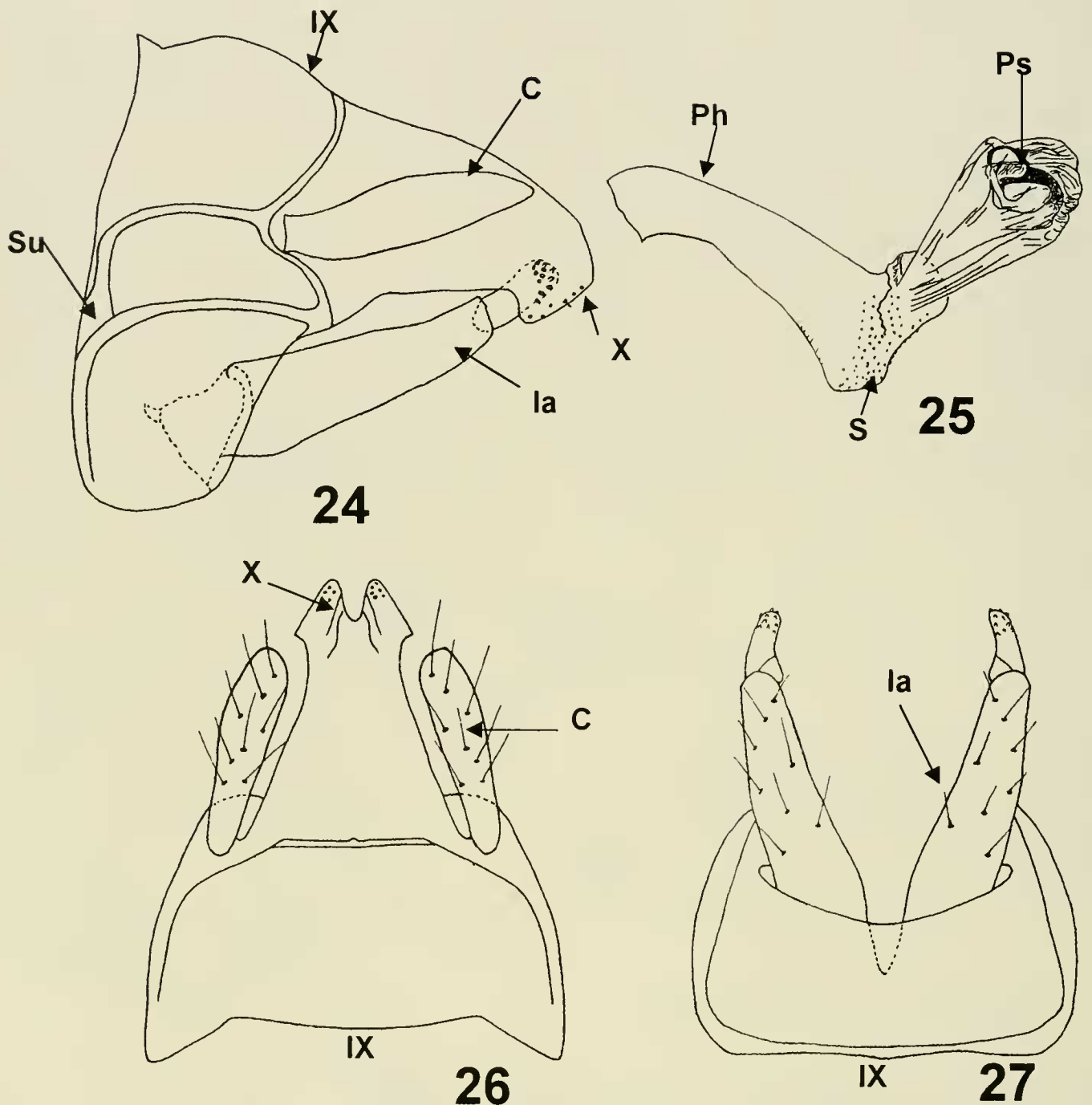


Figs. 18–23. *Marilia flinti*, male genitalia. 18, Lateral view. 19, Phallus lateral view. 20, Phallus lateral view, evaginated. 21, Phallus ventral view. 22, Dorsal view. 23, Ventral view. Ph = Phallobase.

eral and dorsal views digitiform. Segment X in lateral aspect rectangular, apex with a short, triangular process ventrally directed, with posterodorsal margin rounded; in dorsal aspect long, narrow; a membranous apical region with a shallow notch mesally, dividing lateral lobes from sagittate apices. Inferior appendage in lateral aspect with basal segment cylindrical with a distinct triangular, basal insertion; apical segment

elongate; in posterior aspect basal segment cylindrical; apical elongate with dark, conical spines. Phallus in lateral view tubular, slightly curved at base, endothelial membrane with small spines; phallostremal sclerite semicircular, in ventral aspect rounded.

Type material.—Holotype, ♂: MEXICO: Tabasco: Municipio Huimanguillo, Carlos A Madrazo, 17°23.759N, 93°39.757W, Rio Pueblo Viejo, 12-vi-1997, J. Bueno and R.



Figs. 24–27. *Marilia furthi*, male genitalia. 24, Lateral view. 25, Phallus lateral view. 26, Dorsal view. 27, Ventral view.

Barba (CNIN). Paratypes: Same data as holotype, 5 ♂ (CNIN).

Etymology.—This species is named with gratitude and affection for Dr. David Furth, notable coleopterist and friend.

Marilia holzenthali

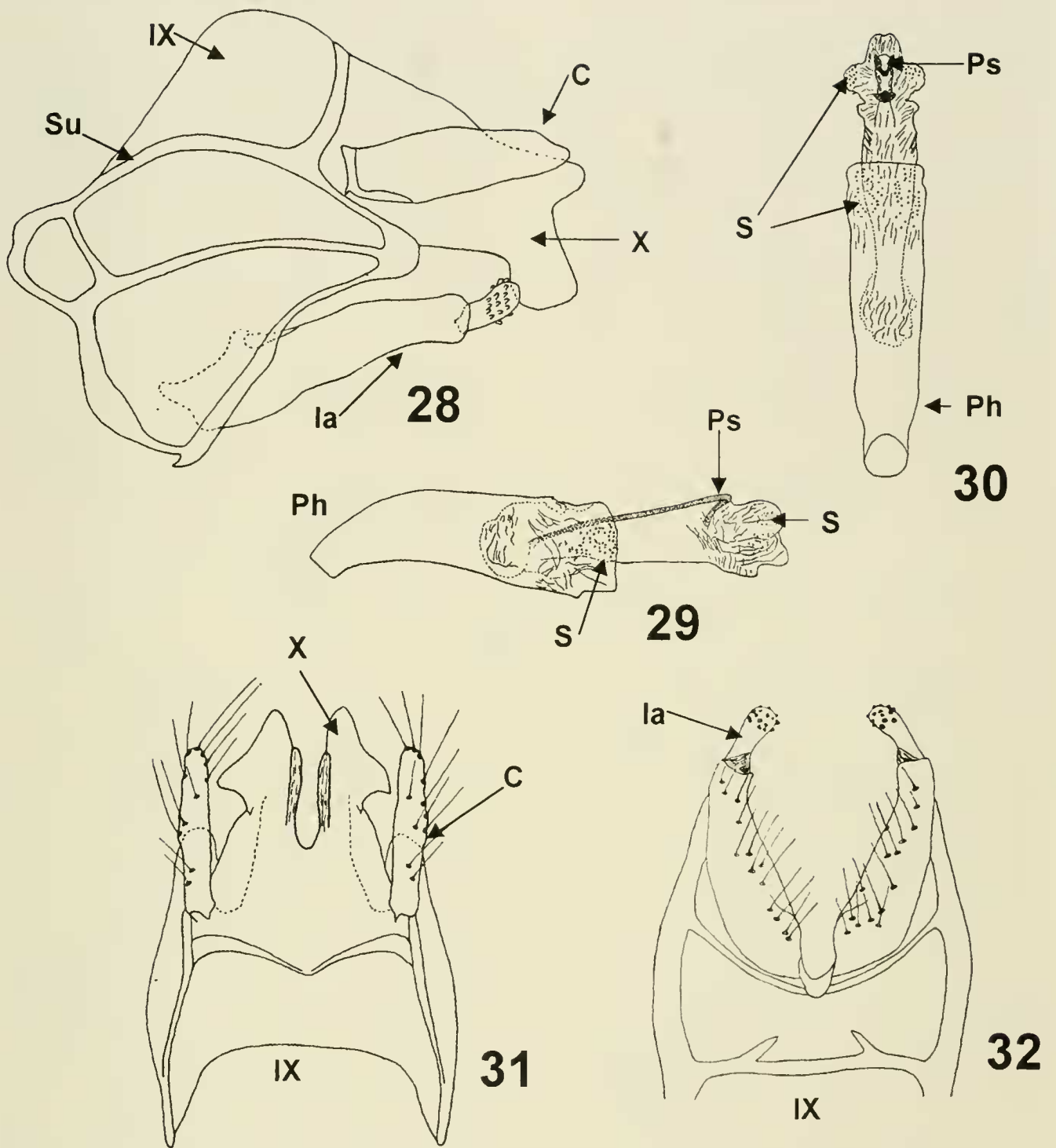
Bueno and Rojas, new species

(Figs. 28–32)

Marilia holzenthali appears to be related to *M. flinti* by the similar shape of the segment IX in lateral aspect, with its produced posterior margin and similar distribution of

sutures. However, *M. holzenthali* can be recognized from *M. flinti*, by the sagittate apex of segment X and by the presence of small spines on the endothecal membrane of the phallus.

Male.—Eyes large, separated middorsally. Length of forewing 9 mm. Fuscous. Spurs 2,4,4. Genitalia: Segment IX with anterior margin lightly produced in a square projection; posterior margin produced at midlength, with lateral sutures almost parallel, dorsal brace slightly curved, ventral one almost straight. Cercus in lateral and

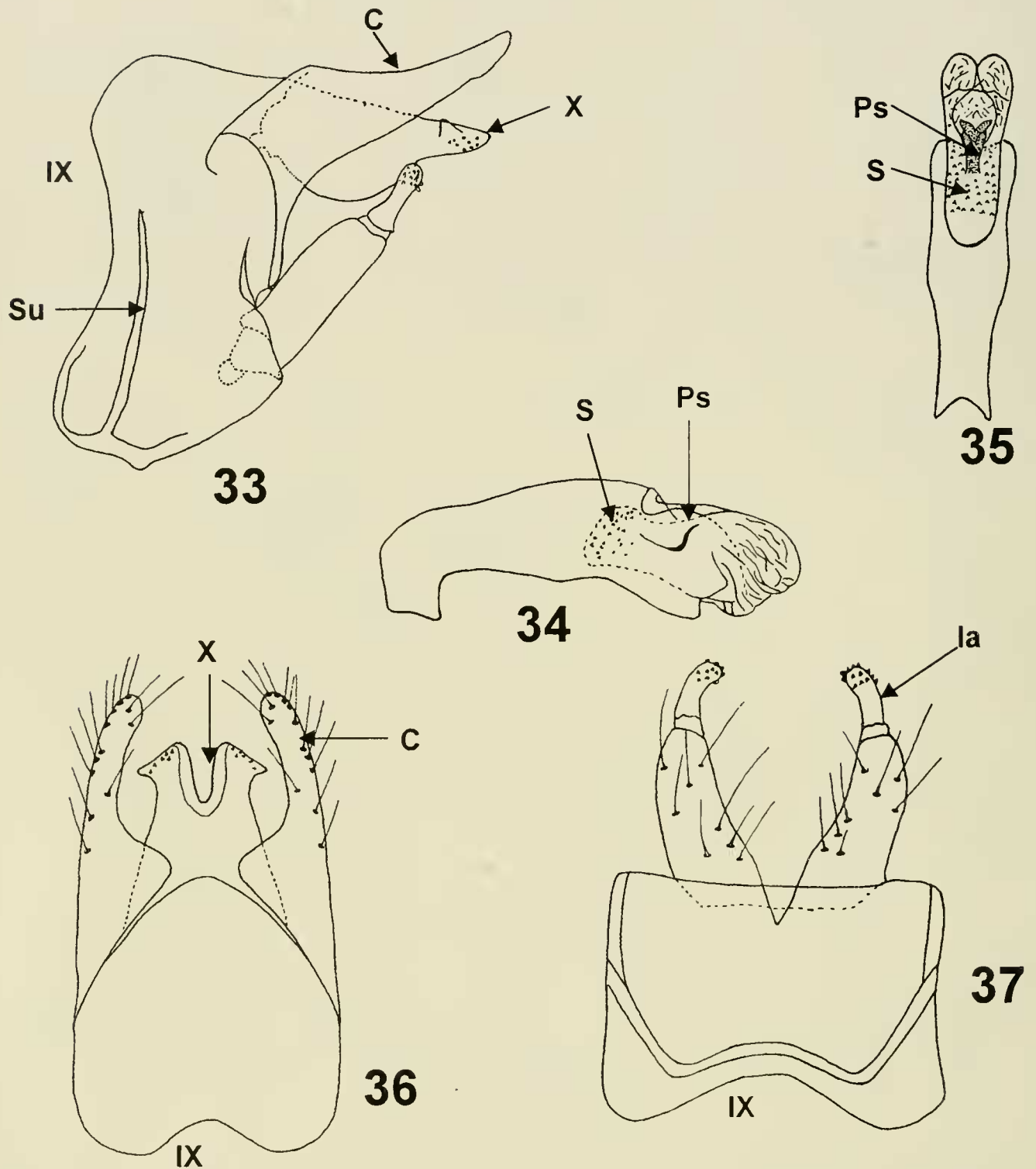


Figs. 28-32. *Marilia holzenthali*, male genitalia. 28, Lateral view. 29, Phallus lateral view. 30, Phallus ventral view. 31, Dorsal view. 32, Ventral view.

dorsal view thumblike. Segment X in lateral aspect rectangular, with apex produced in a short, rectangular, ventral process and a posterodorsal rounded, small process; in dorsal aspect membranous, with a deep, wide notch on apex, with lateral, sagittate processes. Inferior appendage in lateral aspect with basal segment cylindrical with a distinct triangular basal insertion; in posterior aspect curved; apical segment small, ovoid with dark conical spines. Phallus in

lateral view tubular, slightly curved, endothelial membrane with small, dark spines; phallotremal sclerite rod-like, in ventral aspect V-shaped.

Type material.—Holotype, ♂. BELIZE: Rio Privassion, Blancaneaux Lodge, 9-VII-1963, Y. Sedman (NMNH). Paratypes: Same data as holotype, 1 ♂ (NMNH); GUATEMALA: Dept. Izabal, Matias de Galvez, 14,16-viii-1965, Flint & Ortiz, 2 ♂ (NMNH).



Figs. 33–37. *Marilia kingsolveri*, male genitalia. 33, Lateral view. 34, Phallus lateral view. 35, Phallus ventral view. 36, Dorsal view. 37, Ventral view.

Etymology.—It is a pleasure to name this species with gratitude and affection for Dr. Ralph Hozenthal, notable Trichopterist and long time friend at the University of Minnesota.

Marilia kingsolveri

Bueno and Rojas, new species

(Figs. 33–37)

Marilia kingsolveri appears to be related to *Marilia morsei* by the similarities of the

elongate cercus and by the presence of only one small suture on segment IX. However, in *M. kingsolveri* the cercus appears elongate in lateral and dorsal aspects, with the apical region digitiform while in *M. morsei* the apex is spatulate.

Male.—Eyes large, almost touching mid-dorsally. Length of forewing 8.5 mm. Fuscous. Spurs 2,4,4. Genitalia: Segment IX in lateral aspect with anterior margin slightly

concave, posterior margin sinuous, lateral suture incomplete, parallel to anterior border, slightly curved. Cercus in lateral view longer than segment X, rectangular, tapering from midlength to apex, with apical region digitiform; in dorsal aspect with apical region long and lightly curved, with basidorsal lobes convergent. Segment X in lateral aspect widely rounded midventrally, with small posterodorsal dentiform process; in dorsal aspect membranous, with a deep, mesal notch on apical region, dividing lateral lobes with sagittate apices. Inferior appendage in lateral aspect with basal segment cylindrical, basally inserted by elliptical process, apical segment elongate, narrower at midlength. Phallus in lateral view cylindrical, lightly curved at base, endothecal membrane with small spines; phallotremal sclerite in lateral aspect sinuous, in ventral view V-shaped.

Type material.—Holotype, ♂. COSTA RICA: Puntarenas, Rio Bellavista, ca. 1.5 km NW Las Alturas, 8.951°N, 82.846°W, el. 1400 m, 8,9-iv-1987, Holzenthal, Hamilton & Heyn (UMSP). Paratypes: COSTA RICA: *Puntarenas*: Rio Bellavista, ca. 1.5 km NW Las Alturas, 8.951°N, 82.846°W, el. 1400 m, 2,3-viii-1987, Holzenthal, Morse & Clausen, 2 ♂ (UMSP); Puntarenas, Rio Guineal, ca. 1 km (air) E. Finca Helechales, 9.076°N, 83.092°W, el. 840 m, 22-ii-1986, Holzenthal, Morse & Fash, 1 ♂ (UMSP); *Guanacaste*: Parque Nacional Guanacaste, Rio San Josecito, Est. Mengo, 10.922°N, 85.470°W, el. 960 m, 22,29-vii-1987, Holzenthal, Morse & Clausen, 1 ♂ (UMSP).

Etymology.—It is a pleasure to name this species for Dr. John Kingsolver, notable coleopterist.

Marilia mathisi

Bueno and Rojas, new species

(Figs. 38–41)

Marilia mathisi belongs to the group of species with tibial spurs 2,4,4, and is related to *M. nobsca* by the similar shape of the apex of segment X in lateral and dorsal view. However, *M. mathisi* can be distin-

guished from this species by the two different size squares produced by lateral sutures of segment IX, of which the larger square is incomplete.

Male.—Eyes large, virtually touching mid-dorsally. Length of forewing 12 mm. Fuscous. Spurs 2,4,4. Genitalia: Segment IX with anterior margin slightly sinuous, posterior margin lightly produced with apex rounded, sutures forming two different size squares, large square with suture anterobasally incomplete. Cercus in dorsal and lateral view, long and digitiform. Segment X in lateral aspect wide at base, with narrow apex curved ventrad; in dorsal aspect sagittate, dorsum elongate with a shallow notch at apex. Inferior appendage in lateral aspect with basal segment terete, basal insertion triangular; apical segment short, digitiform. Phallus in lateral aspect curved basally, endothecal membrane with very small spines; phallotremal sclerite in lateral view, hooklike.

Type material.—Holotype, ♂. MEXICO: Durango: 5 mi. SW El Salto, 20-vii-1960, R. A. Scheiber (NMNH). Paratypes: Same data as holotype but, 10,11 mi W El Salto, 10, 29,30-vi-1964, J. E. H. Martin, P.J. Spangler 3 ♂ (NMNH).

Etymology.—It is an honor to name this species with gratitude and affection for Dr. Wayne Mathis, notable Dipterist and long time friend at the National Museum of Natural History, Smithsonian Institution.

Marilia mexicana (Banks)

Leptocerus mexicanus Banks 1901: 368.
Athripsodes mexicanus: Fischer 1965: 211.
Marilia mexicana: Flint 1967: 20.

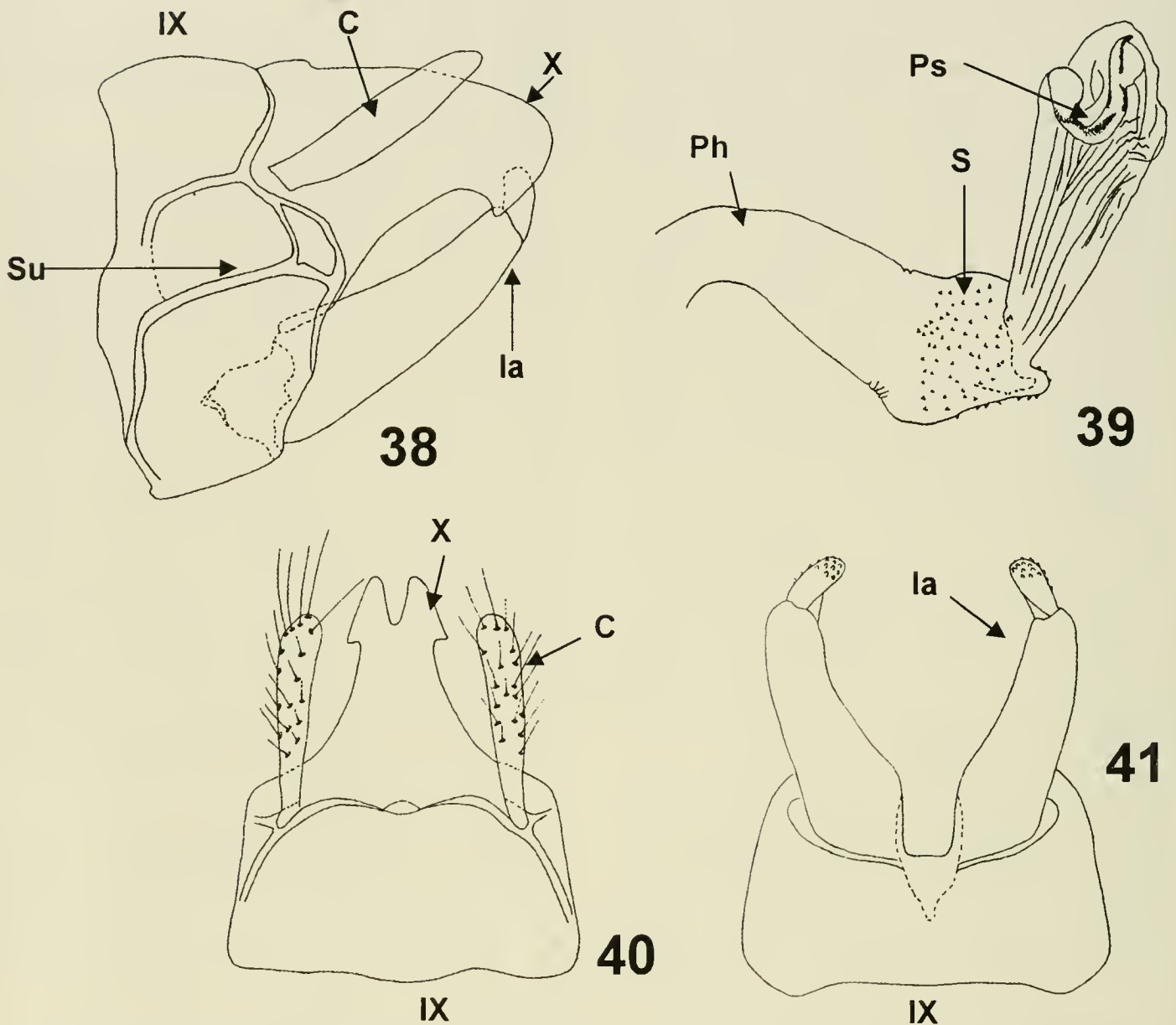
This species is based on the female holotype, and males have not been associated. Therefore, are unable to present figures of the male.

Marilia morsei

Bueno and Rojas, new species

(Figs. 42–46)

Marilia morsei appears to be related to *M. kingsolveri* by the similar elongate size



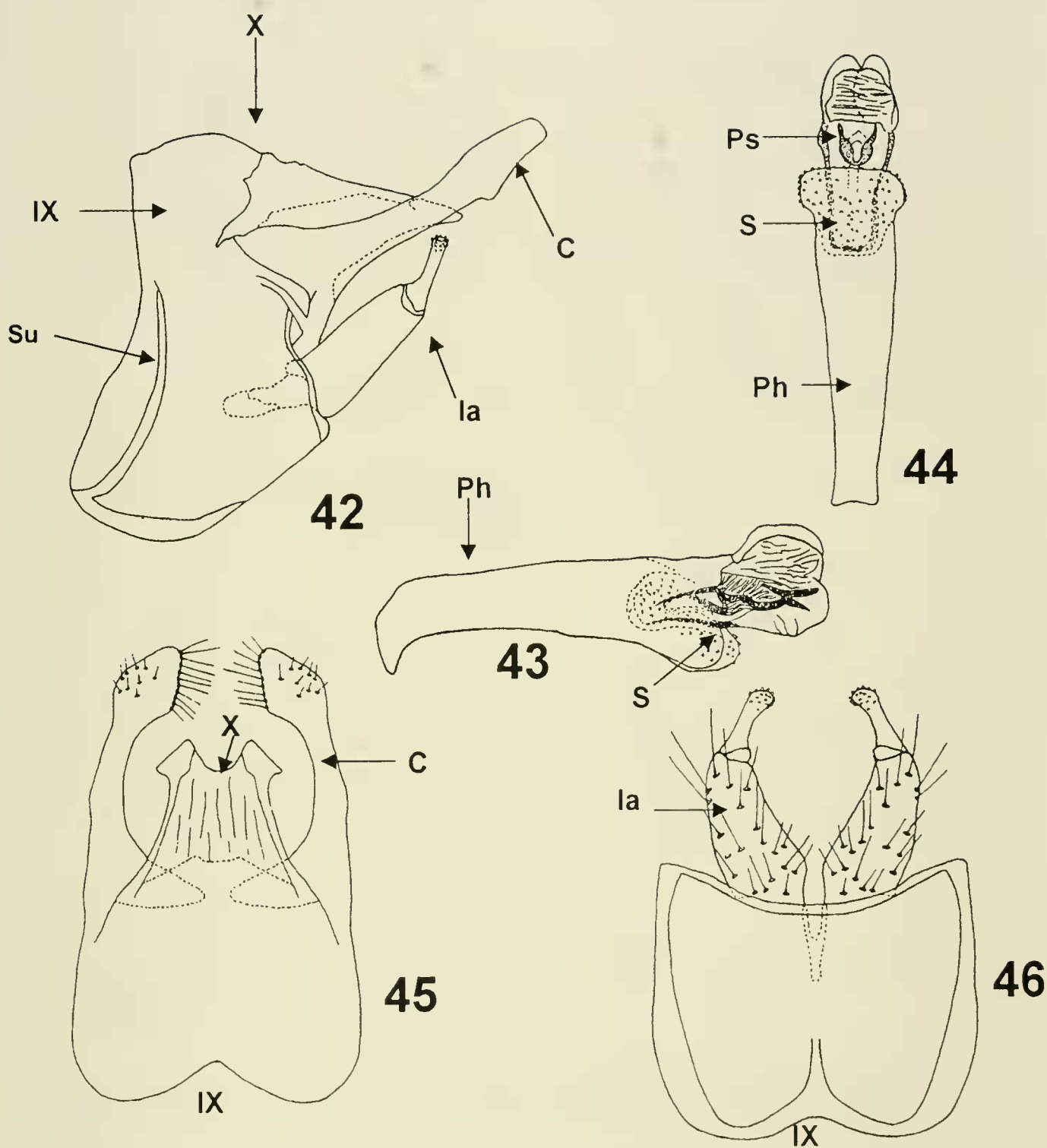
Figs. 38–41. *Marilia mathisi*, male genitalia. 38, Lateral view. 39, Phallus lateral view. 40, Dorsal view. 41, Ventral view.

of the cercus and by the presence of only one small suture on segment IX. However, *M. morsei*, can be recognized by the cercus which appears elongate with apex spatulate in lateral and dorsal aspect, while in *M. kingsolveri* the apex is narrowed and digitiform.

Male.—Eyes large, almost touching mid-dorsally. Length of forewing 9 mm with bands dark and pale. Fuscous. Spurs 2,4,4. Genitalia: Segment IX in lateral aspect with anterior margin lightly concave; posterior margin sinuous, lateral suture lightly curved, incomplete and parallel to anterior border. Cercus in lateral and dorsal views longer than segment X; in lateral aspect wide at base, slightly narrowed at mid-

length, with apical region spatulate; in dorsal aspect long and curved, with apical region squared. Segment X in lateral aspect conical; in dorsal aspect membranous centrally, with a wide, mesal notch on apical region, separating lateral lobes with sagittate apices. Inferior appendage in lateral aspect with basal segment cylindrical, basally inserted by elliptical process; apical segment elongate and digitiform. Phallus in lateral view cylindrical, lightly curved at base, endothelial membrane with small spines; phallosome sclerite in lateral aspect curved, in ventral view V-shaped.

Type material.—Holotype, ♂. GUATEMALA: Dpto. El Progreso. Finca La Cajeta, 12.20-viii-1965, Flint & Ortiz (NMNH).



Figs. 42–46. *Marilia morsei*, male genitalia. 42, Lateral view. 43, Phallus lateral view. 44, Phallus ventral view. 45, Dorsal view. 46, Ventral view.

Paratype: Same data as holotype, 1 ♂ (NMNH).

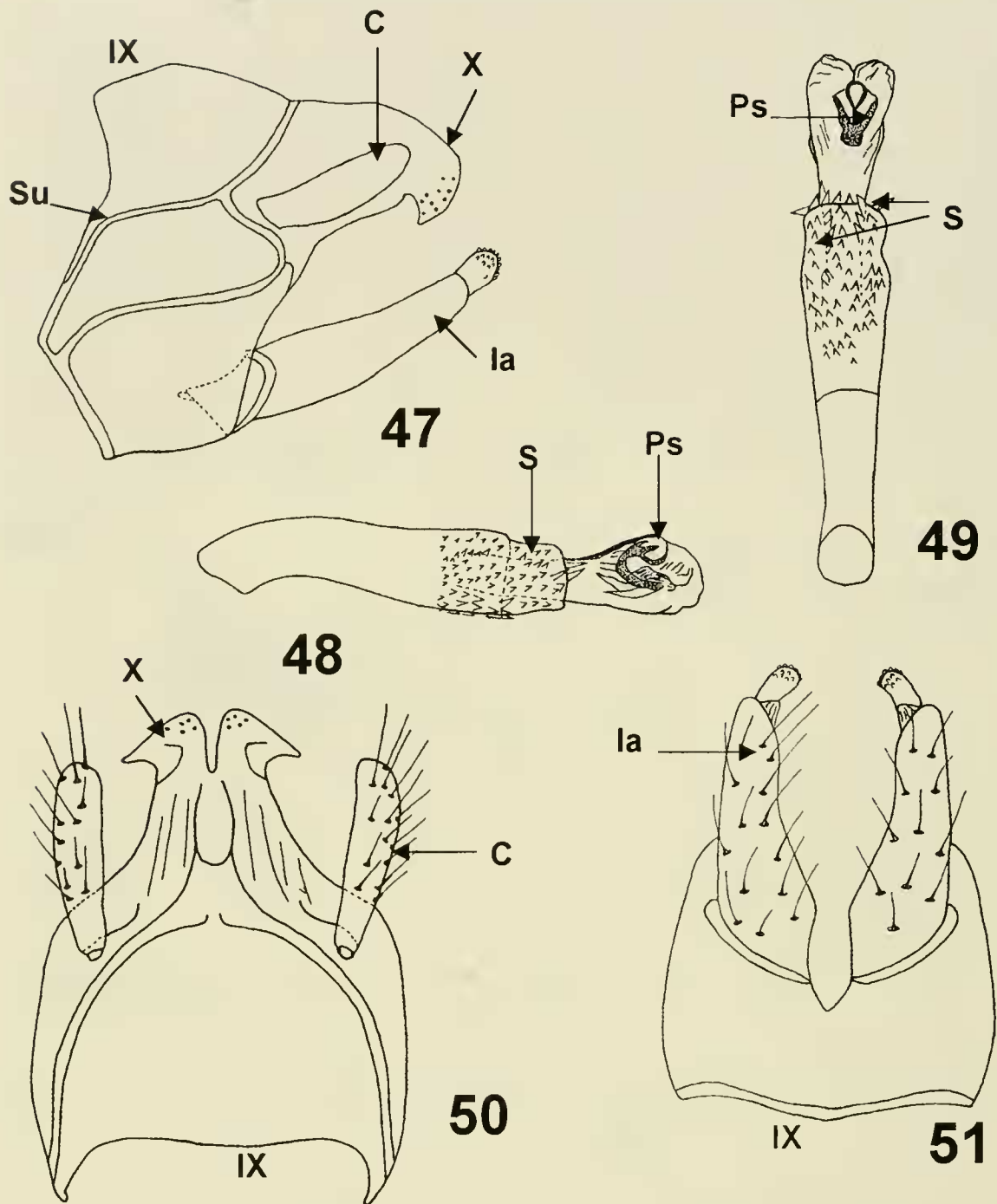
Etymology.—This species is named with gratitude and affection for Dr. John C. Morse, notable trichopterist and long time friend.

Marilia nobsca Milne 1936:79
(Figs. 47–51)

This species, with tibial formula 2, 4, 4, can be recognized by the numerous large

spines on the endothelial membrane of the phallus.

Distribution.—USA: Arizona, Texas. MEXICO. GUATEMALA. Material examined.—USA: *Arizona*: Oak Creek Canyon, 22.vii.1958, C. W. O'Brien, 1 ♂ (CAS); Maricopa Co. Cave Creek, 10.ix.1980, G. Knowlton & W. J. Hanson, 1 ♀ (CAS) MEXICO: *Baja California Sur*: Playa San Cristobal, 16-iv-1984, Brown y Dorero, 1 ♂



Figs. 47–51. *Marilia nobisca* Milne, male genitalia. 47, Lateral view. 48, Phallus lateral view. 49, Phallus ventral view. 50, Dorsal view. 51, Ventral view.

(NMNH); 13 mi. SW San Miguel de Comondu, 7,9-iv-1980, Donna Davies, 1 ♂ (NMNH); Arroyo San Pedro, San Pedro de la Soledad, 27-vi-1988, Baumann, Kondratieff, Wells, Whiting and Kirchner, 2 ♂ (CNIN). *Sonora*: Cyn. de Pulpito 108°58' 30°50', 27-vi-1972, V. Roth, 2 ♂ (CAS); Small Stream, 10 mi. W Yecora, 19-viii-1986, B. C. Kondratieff, 1 ♂ (NMNH). *Chihuahua*: El Jaguey, 20-ix-1984, M. Vertiz, 9 ♂ (CNIN); km 22 Carretera Chihuahua-Ojinaga, 20-x-1984, A. Ibarra, 3 ♂ (CNIN); El Herradero, 23-ix-1984, M. García, 1 ♂

(CNIN); La Mesa, 20-ix-1984, M. García, 4 ♂ (CNIN). *Durango*: Rodeo, 22-viii-1982, R. Barba, 1 ♂ (NMNH); Rio Melones, 17-viii-1977, J. Bueno, 1 ♂ (CNIN); Peñon Blanco, Balneario Belen, 10-viii-1985, E. Mariño, 1 ♂ (CNIN); Cuencame, Balneario Belen, 17-vii-1985, E. Mariño, 19 ♂ (CNIN). *Zacatecas*: Nochistlán, 22.ix.1975, B. Villegas 1 ♂ (CAS). *Veracruz*: Catemaco, Tebanca, 3-iii-1988, R. Barba, E. Barrera, 1 ♂ (CNIN). *Guerrero*: Ruta 130, 80 km NW de Zihuatanejo 1200 m, 7-vi-1984, J. Bueno, 1 ♂ (CNIN); Temazcalapa, rta. 51,

12 km W Ahuehuepan, 28-xii-1994, R. Barba, D. Ocaña, 1 ♂ (CNIN); Rta. 130 Coyuca-Zihuatanejo, 7-vi-1984, J. Bueno, 1 ♂ (CNIN); Placeres del Oro, 22-xi-1984, F. Arias, H. Velasco, 2 ♂ (CNIN). *Estado de Mexico*: Tejupilco, 13-iv-1988, L. Cervantes, 8 ♂ (CNIN). *Oaxaca*: Putla, 3-iii-1986, E. Barrera, 1 ♂ (CNIN); Mixtepec, San Gabriel, 19-vi-1984, H. Velasco, 8 ♂ (CNIN); Km 5.3 SO Putla, 21-x-1989, F. Noguera, A. Rodriguez, 1 ♂ (CNIN). Chiapas: Teopisca, 9-vii-1966 P. J. Spangler, 1 ♂ (NMNH); Rizo de Oro, Nueva Tenochtitlan, Mpio. de Cintalapa, 16°28'34"N, 94°05'07"W, 1-vi-1999, A. Ibarra, M. Balcazar, 3 ♂ (CNIN). GUATEMALA: San Marcos, 17.3 Km. SE Talisman, Rio Cabuz at Hwy Ca 2, 14°51'N, 92°04'W, 200 m, 23-v-1973, 2 ♂ (NMNH).

New records.—MEXICO: Baja California Sur, Sonora, Chihuahua, Durango, Veracruz, Guerrero, Estado de Mexico, Oaxaca, Chiapas. GUATEMALA.

Marilia spangleri

Bueno and Rojas, new species

(Figs. 52–56)

This species and *Marilia holzenthali* have segment X with a deep and wide cleft that separates the lateral lobes, and the position of the lateral sutures is very similar in segment IX. However, *M. spangleri* can be recognized by the short, stout cercus in lateral and dorsal views, and by the lateral lobes of segment X having their apices rounded with a small, dark, preapical dentiform process.

Male.—Eyes small, widely separated middorsally. Length of forewing 10 mm. Fuscous, posterior wings white. Spurs 2,4,4. Genitalia: Segment IX in lateral aspect with anterior margin lightly rounded; posterior margin lightly produced and continuous with segment X, with dorsal sutures prolonged in two parallel side arms over dorsal region, and two ventral arms widely separated, forming with ventral suture a triangle-like area. Cercus in lateral and dorsal view thumblike. Segment X in lateral aspect rectangular, apex with short, rectan-

gular, ventral process and posterodorsal slightly rounded lobe; in dorsal aspect membranous, apical region with a deep, wide mesal notch, separating lateral lobes with rounded apices and a small, dentiform, preapical process. Inferior appendage in lateral aspect with basal segment cylindrical with a distinct triangular, basal insertion; in posterior aspect curved; apical segment small, ovoid with dark, conical spines. Phallus in lateral view tubular, slightly curved, endothecal membrane smooth; phallotremal sclerite rodlike; in ventral aspect rounded and dark.

Type material.—Holotype, ♂. MEXICO: Oaxaca: Sierra de Juarez, Cerro Pelon, km 110 carr. Tuxtepec-Oaxaca, 28-iii-1991, 1-iv-1991, A. Ibarra (CNIN). Paratypes: Same data as holotype, 2 ♂ (CNIN); *Chiapas*: Reserva "El Triunfo", 6-v-1993, R. Barba, E. Barrera, 20 ♂ (CNIN); Rio Lacanja, 22Km N. Ocosingo, 19-v-1991, C. M. & O.S. Flint, 1 ♂ (NMNH).

Etymology.—It is a pleasure to name this species with gratitude and affection for Dr. Paul J. Spangler, notable coleopterist and long time friend.

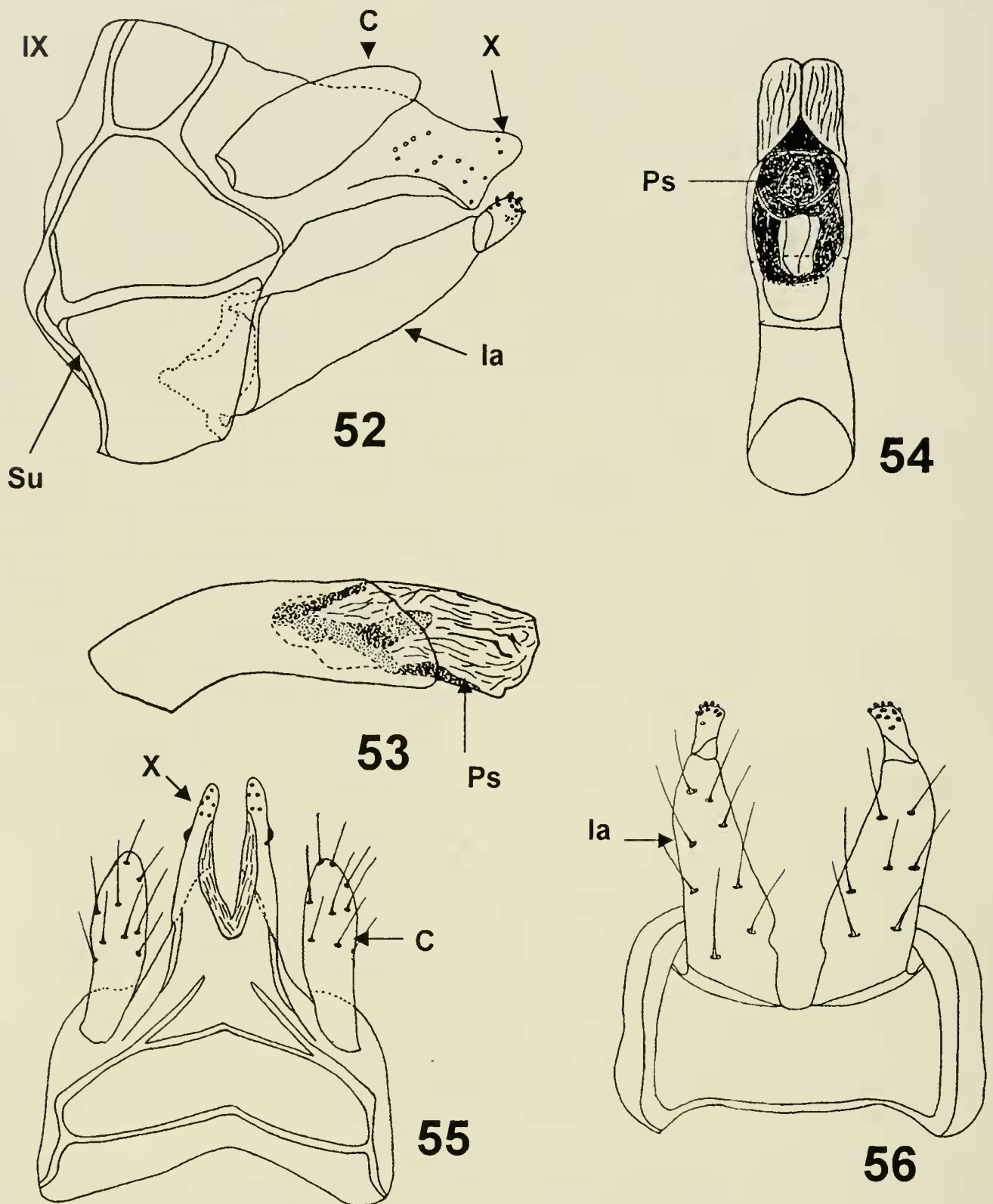
Marilia williammerrilli

Bueno and Rojas, new species

(Figs. 57–61)

Marilia williammerrilli can be considered a distant relative of *M. flexuosa* because of the presence of similar tibial formula, 2,4,2, same size of forewing 6.5 mm, and similar spatulate shape of segment X in lateral view. However, *M. williammerrilli* can be distinguished from that species by the paler coloration of the body, by the lack of stigma in the forewing subcostal area, and by the lateral sutures of segment IX forming two similar squares.

Male.—Eyes large, widely separated middorsally. Length of forewing 6.5 mm. Pale brown. Spurs 2,4,2. Genitalia: Segment IX in lateral view with anterior margin almost straight with small triangular process near base; posterior margin mesally produced with apex rounded; posterior bor-

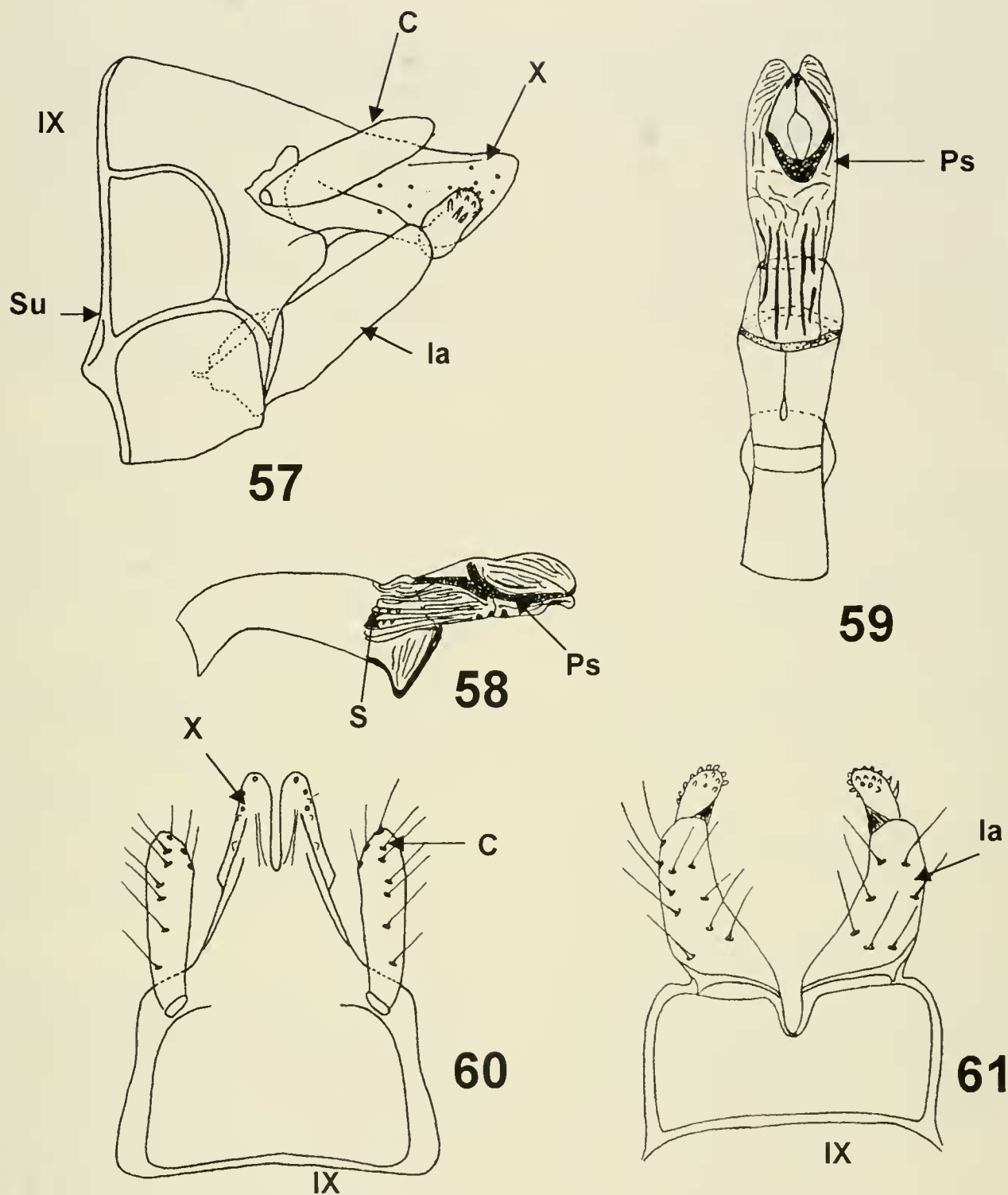


Figs. 52–56. *Marilia spangleri*, male genitalia. 52, Lateral view. 53, Phallus lateral view. 54, Phallus ventral view. 55, Dorsal view. 56, Ventral view.

der with a long suture outlining two similar rectangular areas. Cercus, in dorsal and lateral views, long, and digitiform. Segment X in lateral aspect rectangular, with small rounded, posterodorsal lobe; in dorsal aspect, membranous with apex sagittate, with a deep narrow, notch at apex, separating lateral sagittate lobes. Inferior appendage in

lateral aspect with basal segment terete, basal insertion triangular; apical segment short, and rounded. Phallus in lateral aspect curved basally, endothelial membrane with small spines; phallotremal sclerite elongate, in ventral view V-shaped with a dorsal rounded arms.

Type material.—Holotype, ♂. COSTA



Figs. 57-61. *Marilia williammerrilli*, male genitalia. 57, Lateral view. 58, Phallus lateral view. 59, Phallus ventral view. 60, Dorsal view. 61, Ventral view.

RICA: Alajuela: Reserva forestal San Ramon, Rio San Josecito y tributarios, 10.216°N, 84.607°W, el. 980 m, 30-iii,1-iv-1987, Holzenthal, Hamilton and Heyn (UMSP). Paratype: Alajuela: Cerro Campana, R. Bochinche Trib., 6 km (air) NW Dos Rios, 10.945°N, 85.4130°W, el. 600 m, 22,23-vii-1987, Holzenthal, Morse and Clausen, 1 ♂ (UMSP).

Etymology.—This species is named with

gratitude for Dr. William Merrill, notable Anthropologist at the National Museum of Natural History, Smithsonian Institution.

KEY TO *MARILIA* SPECIES OF MEXICO AND CENTRAL AMERICA

- 1. Tibial formula 2, 4, 2 2
- Tibial formula 2, 4, 4 3
- 2. Eyes widely separated middorsally
 *M. williammerrilli*, n. sp.

- Eyes almost touching middorsally
 *M. flexuosa* Ulmer
- 3. Eyes small, widely separated middorsally 4
- Eyes large, slightly separated middorsally 6
- 4. Segment X in dorsal aspect with a square mesal excision (Fig. 22) *M. flinti*, n. sp.
- Segment X in dorsal aspect without a square mesal excision (Figs. 26, 55) 5
- 5. Segment X in dorsal aspect with apical region with a shallow mesal notch (Fig. 26)
 *M. furthi*, n. sp.
- Segment X in dorsal aspect with apical region with a deep mesal notch (Fig. 55)
 *M. spangleri*, n. sp.
- 6. Eyes well separated middorsally
 *M. holzenthali*, n. sp.
- Eyes slightly separated middorsally 7
- 7. Segment IX in lateral view with only one simple suture (Figs. 33, 42) 8
- Segment IX in lateral view with more than one simple suture (Figs. 1, 6, 38, 47) 9
- 8. Cercus in dorsal view with apex rounded, digitiform (Fig. 36) *M. kingsolveri*, n. sp.
- Cercus in dorsal view with apex spatulate (Fig. 45) *M. morsei*, n. sp.
- 9. Phallus with large visible spines (Figs. 9, 10) *M. nobscia* Milne
- Phallus with tiny, barely visible spines (Figs. 2, 7, 39) 10
- 10. Segment IX in lateral view, with sutures forming a small square on posterior border, (Fig. 38) *M. mathisi*, n. sp.
- Segment IX in lateral view, with sutures not forming such a square on posterior border (Figs. 1, 6) 11
- 11. Segment IX in lateral view with anterior suture apparently lacking (Fig. 1)
 *Marilia baumanni*, n. sp.
- Segment IX in lateral view with anterior suture apparently present (Fig. 6)
 *Marilia crea* Mosely

ACKNOWLEDGMENTS

We are grateful to Oliver S. Flint Jr., Smithsonian Institution, and Ralph W. Holzenthal, University of Minnesota, for their invaluable assistance in sorting material,

verifying identifications, and critically reviewing the manuscript. We are also grateful to Nancy Adams, Smithsonian Institution, for her help during the visit of the senior author at the Smithsonian Institution, to Cheryl Barr, University of California at Berkeley (UCB), and to Keve Rivardo and Vincent Lee, California Academy of Sciences (CAS), for the loan of specimens, and to Rafael Barba-Alvarez for his help during the collection of material in Mexico.

LITERATURE CITED

- Banks, N. 1901. A list of Neuropteroid Insects from Mexico. Transactions of the American Entomological Society 27: 361–371.
- Botosaneanu, L. 1994. A study of the larvae of Caddisflies (Trichoptera) from Cuba. Tropical Zoology 7: 451–475.
- Fischer, F. C. J. 1965. Trichopteronum Catalogus vol. VI. Amsterdam, 239 pp.
- Flint, O. S. Jr. 1967. Studies of Neotropical Caddisflies, V: Types of the species described by Banks and Hagen. Proceedings of the United States National Museum 123(3619): 1–37.
- . 1968. The Caddisflies of Jamaica (Trichoptera). Bulletin of the Institute of Jamaica, Science Series 19: 1–68.
- . 1983. Studies of Neotropical Caddisflies, XXXIII: New Species from Austral South America (Trichoptera). Smithsonian Contributions to Zoology 377: 1–100.
- . 1991. Studies of Neotropical Caddisflies, XLV: The Taxonomy, Phenology and Faunistics of the Trichoptera of Antioquia, Colombia. Smithsonian Contributions to Zoology 520: 1–113.
- Milne, L. J. 1936. Studies in North American Trichoptera, 3. Cambridge, Massachusetts, pp. 56–125.
- Mosely, M. E. 1949. New Trichoptera and a redescription of *Leptocellodes flaveola* Ulmer. Proceedings of the Royal Entomological Society (B)18: 37–41.
- Ulmer, G. 1905. Zur Kenntniss aussereuropäischer Trichopteren. Stettiner Entomologische Zeitung 66: 3–119.
- Wiggins, G. B. 1996. Larvae of the North American Caddisfly Genera (Trichoptera). 2nd ed. University of Toronto Press, Canada, 401 pp.